

The Honorable John C. Coughenour

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

I, Cristina del Amo Casado, declare as follows:

1. ***Identity of Declarant.*** I am employed by Microsoft Corporation (“Microsoft”) in Redmond, Washington, where I have worked since February 2006. My current title at Microsoft is Principal Program Manager, Windows Phone. (Until recently, I was Senior Program Manager, Windows Phone. My position and responsibilities did not change with the change in title.) I have responsibility for the program management function for the Location Team (which developed location services features for Windows Phone 7), and I have had that responsibility since November 2010.

2. ***Familiarity with Issues in Dispute.*** This case involves Windows Phone 7, an operating system for mobile phones. I assumed my current responsibilities shortly after Microsoft released Windows Phone 7 in fall 2010. In my program management role on the

DEL AMO CASADO DECL. IN OPP. TO MOTION
FOR CLASS CERTIFICATION (2:11-cv-01438-JCC) — 1

DWT 22644875v6 0025936-001471

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1 Windows Phone Location Team, I have been deeply involved in developing the specifications
 2 for location services in Windows Phone 7.5, which Microsoft released in September 2011 as an
 3 update to Windows Phone 7, and Windows Phone 8. As a result of my work, I am familiar with
 4 how Windows Phone applications—including the Windows Phone Camera application—
 5 communicate with the location framework on the Windows Phone device and how a Windows
 6 Phone device communicates, if necessary, with the Microsoft servers that provide location
 7 services. (Location framework refers to a stack of software components in Windows Phone 7,
 8 which reside on the phone itself and make the phone's use of location possible. Once the
 9 Windows Phone 7 software is loaded onto the phone, the software logic dictates how the
 10 location framework functions; Microsoft has no ongoing control over the location framework on
 11 the phone.) I am also familiar with how the location framework resolves location requests it
 12 receives from applications on the Windows Phone, as well as the process through which
 13 Microsoft crowd sources location information to its servers to improve the location services it
 14 makes available to Windows Phone users.

15 3. *Location Services Available on Smartphones.* Most modern smartphones offer
 16 users the opportunity to take advantage of location services, which use the device's location to
 17 deliver improved services and experiences to users. For example, location data makes it
 18 possible to provide mapping and navigation services, to facilitate delivery of more relevant
 19 search results, to provide information such as local movie options and directions to the nearest
 20 restaurant or coffee shop, and to allow a user to find nearby friends. Windows Phone 7 itself
 21 includes several applications that, with the user's consent, allow the user to take advantage of
 22 location services, including Maps, which can use location services to Map the user's current
 23 location and provide directions to another location; Camera, which can use location services to
 24 put a location tag on photos for future reference; Search, which can use location services to
 25 deliver search results tailored to the user's location; and Find My Phone, through which location
 26 services help a user locate a misplaced phone. Windows Phone 7 users can also download third-
 27 party applications (i.e., applications developed by companies other than Microsoft) that take

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1 advantage of location services, such as games or commercial applications providing information
 2 on services near the user's location.

3 4. ***Location Settings.*** A Windows Phone 7 device generally allows an application
 4 to access location services ***only*** if the user leaves the master switch for location services "on"
 5 within the Settings menu. (The one exception to this general rule is the Find My Phone
 6 application, discussed below, which can access the phone's location even when the master
 7 location switch is turned "off.") When the user purchases a phone that runs Windows Phone 7,
 8 the master location setting is "on." If the user turns location services "off," applications on the
 9 device (except for Find My Phone) cannot access the phone's location. A user can turn location
 10 services "off" by going to the Settings menu, selecting "location," and then tapping the screen to
 11 turn "location" from "on" to "off." Users can turn the master location switch "on" and "off" as
 12 often as they like, depending on their preferences at any given time. But even if a user leaves
 13 the master switch "on," Microsoft designed Windows Phone 7 so the user still can block the use
 14 of location services by a particular first-party application (i.e., an application, such as Maps,
 15 developed by Microsoft and loaded onto the phone along with the Windows Phone 7 software).

16 5. ***Location Framework.*** When the master switch for location services has been
 17 turned "on" in the Windows Phone 7 Settings, and a user opens an application designed to use
 18 location services, the application will "call" the location framework on the phone itself and
 19 request the phone's location. This initial call does not go to the Microsoft cloud-based location
 20 service, known as Orion; it simply goes from one software component loaded on the phone (the
 21 application) to another software component loaded on the phone (the location framework). The
 22 location framework then applies logic, defined by the highly confidential source code for the
 23 location framework, to obtain location information for the application and to return a location
 24 result to the application for its use. In this Declaration, I will describe generally how the
 25 location framework on the phone resolves location requests from applications, including the
 26 Camera.

1 6. ***Methods of Resolving Location.*** In general, the location framework on the
 2 phone can resolve a location request in three ways. First, the location framework may contact
 3 other components on the Windows Phone 7 device and obtain a GPS (i.e., global positioning
 4 system) fix for the phone's location. Second, the location framework may request an
 5 approximate location from Orion, Microsoft's cloud-based location service. Third, the
 6 Windows Phone 7 software may resolve location requests by referring to location data stored on
 7 the phone in connection with a previous location request to the Orion service.

8 7. ***GPS Location Fixes.*** A GPS fix is the most accurate way to determine location
 9 —but it takes the longest time (in some circumstances, up to 45 seconds), and it consumes more
 10 power and data resources than the other two methods. When location framework resolves
 11 location requests using GPS, it does not transmit location information off the device to any third
 12 party, including Microsoft, in resolving the location request. Instead, to obtain a GPS fix, the
 13 location framework on the phone sends the location request to the GPS engine on the phone.
 14 The GPS engine receives signals from orbiting GPS satellites, and it calculates the phone's
 15 precise location based on the satellite signals. Windows Phone 7 uses "assisted GPS," which
 16 uses external data identifying available GPS satellites and their position to speed up the process
 17 of obtaining a GPS fix. But like standard GPS, assisted GPS does not require the transmission
 18 of any location data off the phone to obtain a GPS fix. I understand the process of obtaining a
 19 GPS fix is not the focus of this lawsuit.

20 8. ***Beacons.*** Resolving location through the other two methods, i.e., using
 21 Microsoft's Orion location service and using location data stored in memory on the phone,
 22 involves the process of inferring location based on WiFi access points (such as wireless internet
 23 routers in a home wireless network or a business) and mobile phone cell towers observed as
 24 being near the phone. Microsoft refers to WiFi access points and cell towers as "beacons"
 25 because they give off signals the Windows Phone 7 device can "see" and use to infer an
 26 approximate location. When an application sends a location request to the location framework,
 27 the framework determines what beacons it can see. The beacons have unique identifiers. The

1 location framework uses those identifiers in an effort to find location information associated
 2 with the beacons it sees. (If the application asks only for a high accuracy fix, the location
 3 framework will first try to satisfy the request through GPS and will infer location using beacons
 4 only if the GPS fix fails. The Windows Phone 7 Camera application, however, requests both a
 5 high accuracy fix and a default accuracy fix. As a result, the location framework seeks to
 6 resolve location using both GPS and available beacons.)

7 9. ***The Orion Database.*** Microsoft's Orion database contains location information
 8 on beacons all around the world. After the location framework on the phone collects
 9 information on the beacons it sees, it may transmit a hash of the unique identifiers (i.e., an
 10 abridged series of numbers derived from the full identifier, which permits matching while
 11 obscuring the full identifier) for the beacons it sees to Microsoft's cloud-based location service,
 12 known as Orion. If the Orion service has location data for those beacons (i.e., latitude and
 13 longitude information), it returns an approximate location to the location framework, which the
 14 framework returns to the requesting application. In addition, Orion returns "tiles" to the location
 15 framework on the phone containing location information in Orion's database for all known
 16 beacons in the vicinity of the beacons recently transmitted by the user's phone. The tiles are
 17 best visualized as rectangular excerpts from Orion's larger map of beacons in the area. (The
 18 size of the tile will depend on the density of beacons. Thus, a tile covering beacons in
 19 downtown Seattle might cover a small geographic area, while a tile in Okanogan County would
 20 cover a larger geographic area—but contain a similar number of beacons.) Orion will return not
 21 only the tile with information on the specific beacons seen by the device, but also adjacent tiles
 22 with location information for other nearby beacons. (In general, Orion will download nine tiles,
 23 visualized as a square with three tiles on each side, and the tile where the user is located in the
 24 middle of the square.) Windows Phone 7 then stores the tiles on the phone, where they will be
 25 available to resolve future location requests efficiently without taking the time, power, and
 26 bandwidth necessary to communicate with Orion.

1 10. ***Resolving Location Through Tiles.*** The quickest and most efficient way to
 2 obtain a location fix is to resolve location from information stored in memory on the phone,
 3 without sending or receiving information from off the device. As a result, Microsoft designed
 4 Windows Phone 7 so location framework resolves location requests using data already on the
 5 phone, if possible: before sending a location request to Microsoft's Orion location service, the
 6 location framework tries to resolve location through information located in random access
 7 memory ("RAM") on the phone itself. In other words, if an application makes a location request
 8 and the location framework can resolve that request by using the tiles previously received from
 9 Orion and stored in RAM, it will do so without transmitting anything to Orion. That means if a
 10 user stays in the general vicinity covered by stored tiles, location requests will be resolved on
 11 the device without transmitting any data to Microsoft's location service. The location
 12 framework sends a location request, with associated data, to Microsoft's servers ***only*** if the tiles
 13 stored in RAM cannot resolve the user's location. This means a user who lives and works in the
 14 same general area will commonly have location requests resolved using tiles previously
 15 delivered by Orion and stored on the phone.

16 11. ***Example of Resolving Location on the Device.*** A simple example illustrates
 17 how this process works. If a user opens the Maps application to get directions and keeps the
 18 Maps application open as she travels, the location framework will provide updated location
 19 information as she moves, allowing her to receive turn-by-turn directions. If the user travels
 20 outside the area covered by tiles already stored on the phone, the phone will ask Orion to send
 21 new tiles covering beacons seen by the device and not previously known, and the tiles will be
 22 stored on the phone. Once the user arrives at her destination, she may turn off Maps—but the
 23 tiles will remain stored in RAM on her phone. If she then opens the Camera application to take
 24 a picture and the Camera requests location from the location framework, that request will be
 25 resolved ***on the device*** (using the recently downloaded tiles through the use of the Maps
 26 application) ***without any communication to Orion.*** Similarly, if the user then closes the Camera
 27 and opens Maps to get directions to a nearby restaurant, that request as well will be resolved on

1 the device itself, as long as the restaurant is within the area covered by the downloaded tiles. If
 2 the user stays at her destination for a few days (for example, if she is vacationing there), all of
 3 her Windows Phone 7 location requests during that period could be resolved using the tiles
 4 downloaded during her initial use of the Maps application, without any further communication
 5 to Microsoft's servers.

6 12. *Absence of Any Record of Transmissions.* In the scenario described in
 7 paragraph 11, the user knows only that Windows Phone 7 obtained the necessary location
 8 information; she has no way to know whether location framework used data on the phone or
 9 data from Orion (or a GPS fix) to resolve the application's request. Further, the Windows Phone
 10 7 device does not store any information from which one could determine whether location
 11 framework resolved a particular request on the phone itself or through Orion. And Microsoft
 12 has no record of (or way to know about) location requests resolved on the phone itself using tiles
 13 stored in RAM. (I am aware Orion likewise collects no information allowing Microsoft to
 14 determine whether a particular device transmitted a location request.)

15 13. *Impact of Find My Phone on Stored Data.* Windows Phone 7 has an application
 16 called Find My Phone, which allows a user who has misplaced her phone to access her account
 17 on the web and then find the phone on a map. Find My Phone works only if the phone is
 18 transmitting location data. Thus, once a user activates Find My Phone, the device periodically
 19 (i.e., roughly every 4 hours) requests location—even if the master location switch has been
 20 turned “off.” When Orion receives that location request, it will download tiles, just as it does
 21 when it receives location requests from any other application. As a result, a Windows Phone 7
 22 user who activates Find My Phone will have tiles on the device frequently refreshed even if the
 23 user turns the master location switch “off”—increasing the likelihood that another application’s
 24 request for location will be resolved on the phone without communicating with Orion. Thus, if
 25 someone turns on Find My Phone and leaves it on, then uses the Camera application without
 26 traveling since the last location call by Find My Phone, the Camera will resolve location based
 27

1 on tiles stored on the phone as a result of the periodic location updates through Find My Phone,
 2 without transmitting any information about location to Microsoft.

3 14. *Duration and Disposition of Tiles.* Tiles generally stay on the device for ten
 4 days before Windows Phone 7 considers them to be stale. Tiles also may be replaced by newer
 5 tiles if the new tiles cannot be accommodated on the device without older tiles being deleted.
 6 Once tiles are unloaded from memory, they disappear. The information contained on the tiles is
 7 not communicated back to Microsoft or anywhere else, and the device has no record of unloaded
 8 tiles.

9 15. *Uncertainty of Locating Beacons.* The previous paragraphs all assume the
 10 location framework on the phone sees beacons when it receives a location request from an
 11 application. But beacons are not always visible to the Windows Phone 7 device. People who
 12 camp, for example, may be out of range of cell towers and WiFi routers, meaning their
 13 Windows Phone 7 device will not see any beacons. In that event, location framework will not
 14 (indeed, cannot) communicate any location information back to Orion. Instead, the framework
 15 would resolve an application's location requests (such as a request by the Camera, if the user
 16 wants to tag photos while on a camping vacation) solely by obtaining a GPS fix—which would
 17 be available even while camping in a remote area. And when the Windows Phone 7 location
 18 framework obtains a location fix using GPS without seeing any beacons, it will not transmit any
 19 location information to Microsoft. Thus, just as resolving location locally on the phone occurs
 20 without transmitting data back to Microsoft, resolving location while out of range of beacons
 21 likewise occurs without sending location data to Orion.

22 16. *Crowd Sourcing.* In certain circumstances, a Windows Phone 7 device also may
 23 send location data to Microsoft's servers in connection with crowd sourcing location data.
 24 Crowd sourcing refers to Microsoft's collection of location data points from Windows Phone
 25 devices to improve the coverage and accuracy of the Orion database of WiFi access points and
 26 cell towers and to keep the Orion database fresh, so it has location data associated with new
 27 beacons or beacons that have moved (as may occur, for example, if a family or business moves

1 and takes its WiFi router to the new location). Crowd sourcing may occur when a Windows
 2 Phone 7 device obtains a GPS fix while seeing beacons. The phone collects the GPS data
 3 (latitude, longitude, and altitude), associates the location data with the unique identifiers for the
 4 beacons it sees, and stores that data in a crowd sourcing buffer in the phone's RAM. When the
 5 Windows Phone 7 software can upload that data without any material impact on the user—such
 6 as when the device has a WiFi connection or is already transmitting another location request to
 7 Orion through a non-roaming cell phone connection—the device will upload some of the
 8 observations to the Orion database, adding new data points and thereby improving Microsoft's
 9 location services.

10 17. ***Limitations on Collecting Crowd Sourced Data.*** An application's request for
 11 location often fails to result in collecting crowd sourced data for the Orion location service.
 12 First, a Windows Phone 7 device often fails to obtain a GPS fix in connection with a location
 13 request, and a Windows Phone 7 device collects data for crowd sourcing purposes only when the
 14 device obtains a GPS fix. Because a GPS fix depends on a line of sight from the phone to GPS
 15 satellites, a request for location while the user is indoors or in an urban canyon (e.g., on a
 16 downtown street with tall buildings on either side) often fails to return a GPS fix, which in turn
 17 means no data is stored in the crowd sourcing buffer within the device's RAM. (This can occur
 18 even if a user is standing by a window in a building, depending on whether the window is tinted
 19 or has film that would interfere with a GPS signal.) Thus, for example, if a user opens the
 20 Camera application in her office (or outside in mid-town Manhattan, in the midst of tall
 21 buildings) and takes a photo with the master location switch turned "on" in the Settings menu,
 22 the location framework is unlikely to get a GPS fix and therefore unlikely to collect location
 23 data for crowd sourcing purposes.

24 18. ***Limitations on Uploading Crowd Sourced Data.*** Even if a Windows Phone 7
 25 device collects and stores location data in the crowd sourcing buffer in RAM, it may never
 26 transmit that data to Microsoft's servers. As explained above in paragraph 16, Windows Phone
 27 7 waits for an opportune time to transmit crowd sourced data to Orion, in an effort to minimize

1 the impact of the transmission on the user. If the user has only a roaming cell connection (such
 2 as, for example, if the user is vacationing in Canada, Mexico, or some other location outside the
 3 United States), the device will not upload crowd sourced data. Further, if the user turns off the
 4 device (for example, when boarding a plane or attending a movie), runs down the battery, has a
 5 service interruption, or fills the crowd sourcing buffer in RAM with new observations (causing
 6 the old observations to drop off) before the device has an opportunity to upload previously
 7 collected crowd sourced data, the phone will never transmit those observations to Microsoft's
 8 Orion location database. And just as a user cannot tell whether an application's request for a
 9 location fix results in transmitting location data to Microsoft's servers, the user cannot tell if
 10 crowd sourced location data has been collected, stored, or sent to Microsoft's servers when the
 11 user's application made a location request.

12 19. ***Role of Location Framework.*** As this Declaration explains, the location
 13 framework on a Windows Phone 7 device obtains an application's location request, interacts
 14 with the appropriate location resources for resolution, coordinates the logic that leads to a
 15 resolution, and then returns a result to the application. GPS satellites may provide the
 16 information necessary to resolve the request. The information might also come from the cloud-
 17 based Orion location service, either in the form of a location result or in the form of tiles
 18 downloaded from Orion that allow the device to resolve location requests without repeated
 19 communication to Orion's servers. The Windows Phone 7 device thus functions as the "client"
 20 for location services provided by the GPS satellites and Orion.

21 20. ***Summary.*** In summary, determining whether a Windows Phone 7 phone
 22 transmits location information to Microsoft as a result of a location request from the Camera
 23 application—either for purposes of resolving the location request or in connection with crowd
 24 sourcing—requires consideration of a variety of circumstances associated with the particular
 25 location request. In many common circumstances, a location request will not result in any
 26 communication to Microsoft's Orion location service, either to resolve the location request or to
 27 crowd source data that might be obtained as a result of the location request. And any

1 communication of location information to Microsoft's Orion location service, as described
 2 above, is initiated by the location framework on the device **not** by a call from Orion.

3 21. ***Correction of Misstatements.*** I have read the Plaintiff's Motion for Class
 4 Certification. Although I understand this case involves legal arguments and the parties have
 5 different perspectives on the issues, some factual misstatements need to be corrected. The most
 6 egregious examples include the following:

7 a. Page 4, line 4 of the Motion suggests Microsoft developed its location
 8 services database because Apple "had a significant head start." The opposite is true. At
 9 the time in question, Apple used Skyhook Wireless, a third party, to provide its location
 10 services; it did not even have its own location database.

11 b. Page 4, line 10 of the Motion refers to Microsoft "aggressively" crowd
 12 sourcing location data. The opposite is true. As explained above, Microsoft carefully
 13 limits its collection and transmission of crowd sourced observations to circumstances in
 14 which the observations can be uploaded to the Orion database with no material impact on
 15 the user in terms of consumption of power or bandwidth.

16 c. Page 5, line 15 of the Motion says Microsoft designed "Location
 17 Framework ... to give Microsoft constant access to a User's location information." That
 18 is incorrect. Microsoft receives information about beacons only in the circumstances I
 19 described above, and it does not associate beacon information to the whereabouts of a
 20 particular user. Microsoft has no interest in any particular user's location—which is why
 21 Microsoft implemented process and software changes in May 2011 to ensure all users'
 22 location information remained anonymous.

23 d. Page 8, lines 4 and 11 of the Motion suggest "Microsoft" accesses data in
 24 a user's RAM when location framework attempts to resolve location by accessing tiles
 25 stored in RAM. This is absurd. The location framework is a software component in
 26 Windows Phone 7, which resides entirely on the device. Microsoft cannot access
 27

1 location information stored in RAM; indeed, Microsoft does not even have a way to
2 know when location framework accesses RAM to resolve a location request.

3 I declare under penalty of perjury that the foregoing is true and correct.

4 Executed this 4th day of October, 2013, at Redmond, Washington.

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CERTIFICATE OF SERVICE

I hereby certify that on October 7, 2013, I electronically filed the foregoing with the Clerk of the Court using the CM/ECF system, which will send notification of such filing to those attorneys of record registered on the CM/ECF system. All other parties (if any) shall be served in accordance with the Federal Rules of Civil Procedure.

DATED this 7th day of October, 2013.

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